Claim 1 (Currently Amended) A method of fabricating a silicide on the surface of a SiGe containing substrate comprising:

providing a structure including a Co layer comprising at least Ni on top of a SiGe containing substrate; and

subjecting the structure to a self-aligned silicide process to form a solid solution of (Co, Ni) disilicide on said SiGe containing substrate, whereby said Ni reduces the formation temperature of the disilicide as compared to a Co layer not containing said Ni and wherein an interface is formed between said disilicide and said SiGe-containing substrate that is smoother than a $CoSi_2$ interface.

Claim 2 (Original) The method of Claim 1 wherein the self-aligned silicide process comprises a first anneal performed at a first temperature that is capable of forming a high resistance silicide phase material; a selective etch to remove unreacted metal from regions not in contact with the SiGe substrate; and a second anneal performed at a second temperature that is higher than the first temperature of the first anneal.

Claim 3 (Original) The method of Claim 2 wherein the first anneal is performed at a temperature of from about 400° to about 600°C for a time period from about 1 to about 90 seconds using a continuous heating regime or various ramp and soak heating cycles.

Claim 4 (Original) The method of Claim 2 wherein the second anneal is performed at a temperature of from about 600°C to about 800°C for a time period from about 1 to about 90 seconds using a continuous heating regime or various ramp and soak heating cycles.

Claim 5 (Original) The method of Claim 1 wherein the Co layer comprising at least Ni contains from about 0.1 to about 40 atomic percent Ni.

Claim 6 (Original) The method of Claim 5 wherein the Co layer comprising at least Ni contains from about 5 to about 30 atomic percent Ni.

Claim 7 (Original) The method of Claim 1 wherein the Co layer comprising at least Ni is a Co-Ni alloy or a multilayered stack comprised of Co/Ni or Ni/Co.

Claim 8 (Original) The method of Claim 1 wherein the Co layer comprising at least Ni further comprises an additive selected from the group consisting of C, Al, Si, Sc, Ti, V, Cr, Mn, Fe, Cu, Y, Zr, Nb, Rh, In, Sn, La, Hf, Ta, W, Re, Pt, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, So, Er, Tm, Yb, Lu and mixtures thereof.

Claim 9 (Original) The method of Claim 8 wherein the additive is Ti, V, Cr, Zr, Nb, In, Sn, Hf, Ta, W, Re or Pt.

Claim 10 (Original) The method of Claim 8 wherein said additive is present in said Co layer comprising at least Ni in an amount of from about 0.1 to about 40 atomic percent.

Claim 11 (Original) The method of Claim 2 wherein said first and second anneals comprise a rapid thermal annealing (RTA) process.

Claim 12 (Original) The method of Claim 2 wherein said first and second anneals are each carried out in an inert, nitrogen or forming gas atmosphere.

Claim 13 (Original) The method of Claim 2 wherein the first and second anneals are each performed at a rate from about 25 to about 75°C/sec.

Claim 14 (Original) The method of Claim 1 wherein a diffusion barrier is formed atop the Co layer comprising at least Ni prior to said self-aligned silicide process.

Claim 15 (Original) The method of Claim 14 wherein the diffusion barrier comprises TiN, W, WN, or Ti.

Claim 16 (Original) The method of Claim 14 wherein the diffusion barrier is removed by a selective etching step of said self-aligned silicide process.

Claim 17 (Currently Amended) A method fabricating a silicide on the surface of a SiGe containing substrate comprising:

providing a structure including a Co layer comprising at least Ni on top of a SiGe containing substrate;

performing a first anneal at a first temperature that is capable of forming a high resistance silicide phase material by reacting said Co layer comprising Ni with Si present in said SiGe containing substrate;

selective etching the structure to remove unreacted metal from regions not in contact with the SiGe substrate; and

performing a second anneal at a second temperature that is higher than the first temperature of the first anneal, said second anneal converts the high resistance silicide phase material into a solid solution of (Co, Ni) disilicide, wherein the first and second anneal are carried out using a rapid thermal annealing process in a gas atmosphere containing at least one gas selected from the group consisting of He, Ar, N_2 and forming gas, and wherein said Ni reduces the formation temperature of the disilicide as compared to a Co layer not containing said Ni and wherein an interface is formed between said disilicide and said SiGe-containing substrate that is smoother than a $CoSi_2$ interface.

Claim 18-27 (Cancelled)